REMARKS

The application is believed to be in condition for allowance.

This amendment replaces the previously filed and unentered amendment of May 12, 2004, which unentered amendment should remain unentered.

Claims 1-20 are pending with claims 1, 3, and 17 being independent and 9-20 being newly added.

There are no formal matters outstanding.

The Advisory Action

The Advisory Action seems concerned with the amendments, in the unentered May 12th amendment, that are directed to specific frequency ranges. That is, the recitations that the present invention is practiced over the specific frequencies delimited by xDSL use. Note that the title of the invention is "Method of Measuring and Improving XDSL Transmission Characteristic" and the disclosure in the specification is directed to "improving the transmission characteristics of XDSL" (page 1, Field of the Invention).

As to these frequencies, one of skill would be familiar with the limited frequency range that corresponds to xDSL, as well as particular versions of DSL, e.g., ADSL. Attached are four documents taken from the Internet which are believed to

illustrate that it is known that xDSL utilizes frequencies above telephone bandwidth (from about 3 kHz to 3.2 MHz) and that ADSL uses 2 kHz to 1.1 MHz. DMT (Direct Multi-Tone) xDSL ranges from 24 kHz to 1.1 MHz, divided into 256 bands of 4.3125 KHz as per ANSI T1.413 (see page 2 of 2 of the Wailan Communication xdsl.htm attached).

Although these ranges may not be explicitly stated in the specification, the specification was drafted to one of skill and one of skill would know these ranges. Further is that specification page 3, in the Brief Description of the Drawings states that "FIG. 1 shows specific frequency bands assigned to a DMT (Direct Multi-tone) xDSL system and other communication systems;". On specification page 4, it is noted (in the first full paragraph) that Figure 3 also shows frequency bands assigned to DMT xDSL and ADSL. See that ADSL is shown at frequencies above POTS whereas SDSL is shown extending into POTS frequencies.

In view of this, the present amendments are believed to be fully supported. Note that these frequencies are being recited to distinguish the present invention from techniques/systems not measuring xDSL, as evidenced by measurements extending to 100 MHz. These amendments are necessitated by the peculiarities of claim drafting that require recitations that avoid reading on unrelated devices.

The Official Action

The Official Action rejected claims 1-8 as obvious over KOEMAN et al. 5,731,706 in view of JOLLOTA 6,341,159.

The present invention concerns a method and system for improving a transmission characteristic of an xDSL system, wherein the existing cross-talk noise caused by other subscriber telephone lines, e.g., digital signals carried thereon, is measured on a candidate subscriber telephone line. As shown in Figure 2 of the present application, a voltage measurement is made across the T and R connections of the subscriber telephone line.

The invention tests the telephone lines for cross-talk existing on the telephone line due to interference from other subscriber telephone lines within the frequency range delimited by xDSL use, e.g., from 3kHz to 3.2 MHz.

The inventive testing system transforms a level of cross-talk noise on the subscriber telephone line, in the frequency range of interest, to noise spectrum data by FFT and compares said noise spectrum data with a template for noise level decision to thereby determine whether or not the candidate subscriber telephone line is usable. The present invention need not look outside the xDSL frequency range as those frequencies are of no interest.

KOEMAN et al. is not seen to poll an xDSL circuit as KOEMAN et al. polls a LAN circuit. The LAN circuit is not an xDSL circuit.

KOEMAN et al. discloses testing the quality of a ***LAN cable system*** by injecting ***a pulse signal*** into the telephone line and measuring a response signal so as to assess the quality of the LAN cable system in the frequency appropriate to LAN signals. See KOEMAN et al. Figure 5 disclosing source signal generator 202 with pulse generator 206 providing a stimulus signal into the LAN cable system 14 and receiver 208 measuring the responsive signal.

The present invention measures cross-talk, within the xDSL frequency, caused by cross-talk from adjacent subscriber lines within the frequency range of interest.

KOEMAN et al. is not concerned with the xDSL frequency bands and thus teaches to measure up to 100 MHz as KOEMAN et al. is based on NEXT loss which concerns loss over a range of 1 to 100 MHz. See column 2, lines 56-63 indicating sampling at .15 and .25 MHz intervals over the range 1 MHz through 100 MHz. The tests are driven by the TIA standard TSB 76 (column 2, lines 4-9).

This is outside the range of xDSL use and beyond the range recited in the amended claims. As LAN frequencies increase, KOEMAN et al. would likewise be extended over a greater

range. There is no reason that KOEMAN et al. would be applied to the limited xDSL frequency range.

The teaching of JOLLOTA would be that the KOEMAN et al. system/method could be used at a telephone central office or as part of a craftsperson's test set. Even so modified, KOEMAN et al. concerns a frequency outside that recited.

Also, although JOLLOTA may measure cross-talk without injecting a signal, this does not transfer to KOEMAN et al. KOEMAN et al. injects the test signal to perform the necessary noise measurements for Power Sum Next loss measurement.

Thus, with or without the JOLLOTA teachings, KOEMAN et al. teaches a system and method concerning a frequency range outside of that recited by the claims, and one that requires a test input signal.

In view of the noted differences between the recited invention and the references, both individually and in reasonable combination, the obviousness rejection is not believed to be viable. Reconsideration and allowance of all the pending claims are respectfully requested.

As to new independent claim 17, applicants see no teaching that renders obvious the recitation of a noise level measuring means for measuring an existing level of cross-talk noise on the subscriber line ascribable to first digital signal cross-talk noise within an overlapping frequency range of a first

xDSL channel under test. Nor do applicants see teachings that render obvious the further recitations in the new dependent claims of the first digital signal cross-talk noise being ascribable to an Integrated Service Digital Network signal or to a second xDSL channel, the noise level measuring means for measuring an existing level of cross-talk noise on the subscriber line operates only at frequencies extending up to 1.1 MHz.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. §1.16 or under 37 C.F.R.§1.17.

Respectfully submitted,

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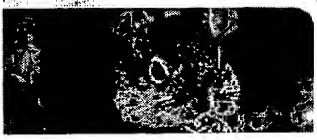
REL/lrs

APPENDIX:

The Appendix includes four attachments illustrating standard xDSL frequency ranges:

- Attachment 1 is from the website of optusbusiness.com;
- Attachment 2 is from the website of Trend Communications;
- Attachment 3 is from the website of wailan.com; and
- Attachment 4 is from the website of cybertrails.com



Frequently Asked Questions

- **What is Broadband?**
- **How does DSL work?**
- **What are the benefits of OBB?**
- **How can DSL be so much faster than dial-up when it uses the same phone line?**
- **What is xDSL?**
- **How does xDSL work?**

xDSL works by utilising more of the bandwidth on copper phone lines than what is currently used for plain old telephone service (POTS). By utilising frequencies above the telephone bandwidth (300Hz to 3,200Hz), xDSL can encode more data to achieve higher data rates than would otherwise be possible in the restricted frequency range of a POTS network. In order to utilise the frequencies above the voice audio spectrum, xDSL equipment must be installed on both ends and the copper wire in between must be able to sustain the higher frequencies for the entire route.

× close

- **What are the various types of xDSL?**
- **How does ADSL work?**
- **Will Broadband constantly connect near the maximum speed, or will it be like my 56K modem that almost never connects at 56K?**
- **Why won't 56K modems go that fast?**
- **Will ADSL work with my computer?**
- **Can I connect a LAN to ADSL?**
- **What is the difference between ADSL and cable modems?**
- **What are the advantages of Permanent Internet Connections over Dial-Up Connections?**
- **What is the Quality of Service (QoS) that Optus uses for Optus Business Broadband?**

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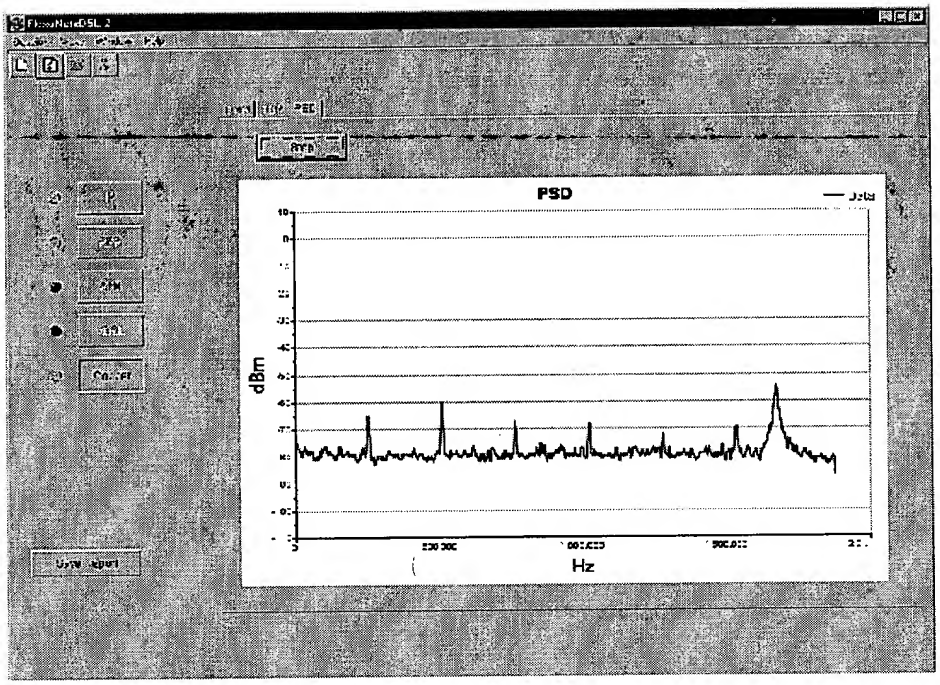
PSD

The PSD displays a graph of power (dBm) against frequency.

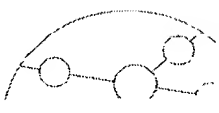


xDSL uses the same copper pair as voice, but the two use different frequency ranges. Voice uses the spectrum from 300 Hz to 3200 Hz and ADSL uses from 20 kHz to 1.1 MHz, SHDSL from XXXXXXXX to XXXXXX. The upstream signal uses the lower part of the spectrum and the downstream signal uses the higher part of the signal.

The spectrum used by ADSL is split into 256 frequency bands. These channels are allocated flexibly by the modems as they attempt to maximise the bit rate, depending on the signal-to-noise ratio for each frequency band. Is this the same for SHDSL ??.

Ouside noise may cause problems with xDSL lines, reducing bit rates or in the extreme meaning that modems do synchronize.

The PSD enables you to identify problems with noise, and identify the frequency of the noise causing the problem.



(2)

Service & Support
xDSL FAQ

PRODUCT DOCUMENTATION
> Data Sheets
> FAQs
> Features
> Glossary
> Software
> Tech Specs
> User Manuals
> White Papers

General FAQ on xDSL Technology

What is xDSL?
What is ADSL?
What is RADSL?
What is SDSL?
What is MSDSL?
What is G.SHDSL?
What is CAP?
What is DMT?

Q. What is xDSL?

A. XDSL is a collective term for all types of Digital Subscriber Line technology. XDSL utilizes the frequencies above voice signals (300 Hz to 3,200 Hz) to transmit data on copper wire.

Q. What is ADSL?

A. Asymmetric DSL is the most popular form of xDSL. The upstream and downstream bandwidth is asymmetric. Upstream is defined as data transmission from the end user to the provider; downstream is defined as data transmission from the provider to the end user. Upstream line rates typically range from 64 Kbps to 1.5 Mbps. Downstream line rates typically range from 1.5 Mbps to 9 Mbps.

Q. What is RADSL?

A. Rate Adaptive DSL uses CAP modulation technique to offer asymmetric data transmission rates. The line rate is automatically adjusted to optimize the signal quality under the line condition.

Q. What is SDSL?

A. Symmetric DSL offers symmetric data transmission ranging128 Kbps to 1.544 Mbps.

Q. What is MSDSL?

A. Multi-rate Symmetric DSL uses CAP modulation technique to offer symmetric data transmission rates up to 2.3 Mbps. The line rate is automatically adjusted to optimize the signal quality under the line condition.

Q. What is G.SHDSL?

A. G.SHDSL is aimed at users of DSL for voice, data and Internet access services. A worldwide standard in progress, G.SHDSL is currently a determined recommendation (G.991.2) before the International Telecommunication Union (ITU). G.shdsl targets the small business market allowing multiple telephone and data channels, videoconferencing, remote Lan Access, and leased lines

with customer-specific data rates among its many exciting characteristics. G.SHDSL is the latest symmetric, rate adaptive DSL technology. Spectrally friendly with other DSLs, it supports symmetric data rates varying from 192 kbps to 2.360 Mbps across greater distances than other technologies.

Q. What is CAP?

A. Carrierless Amplitude and Phase modulation is a proprietary standard implemented by Globespan Semiconductor. CAP uses a two-dimensional passband transceiver line code based on Quadrature Amplitude Modulation. The upstream symbol rate is 136 K baud on a 113.2 KHz carrier. The downstream symbol rate is 340K baud on a 135.5 KHz carrier, 680K baud on a 631 KHz carrier, or 952K baud on a 787.5 KHz carrier. This allows the modem to be symbol rate adaptive to varying line condition. The two modulation carriers cancel each other, hence, carrierless.

Q. What is DMT?

A. Discrete Multi-Tone modulation utilizes frequency range from 24 KHz to 1.1 MHz, which is divided into 256 bands of 4.3125 KHz each. It is able to focus its transmit power on noise-free portions of the spectrum. ANSI T1.413 has adopted DMT as the standard modulation for ADSL.

DSL Glossary

xDSL (Digital Subscriber Line)

DSL is a dedicated, always on (except for MegaBit 256 Select), high-speed connection to the Internet. xDSL utilizes more of the bandwidth on copper phone lines than what is currently used for plain old telephone service (POTS). By utilizing frequencies above the telephone bandwidth (300Hz to 3,200Hz), xDSL can encode more data to achieve higher data rates than would otherwise be possible in the restricted frequency range of a POTS (Plain Old Telephone System) network. In order to utilize the frequencies above the voice audio spectrum, xDSL equipment must be installed on both ends and the copper wire in between must be able to sustain the higher frequencies for the entire route. This means that bandwidth limiting devices such as loading coils must be removed or avoided.

ADSL (Asynchronous DSL)

Asymmetric Digital Subscriber Line (ADSL) is the most popular form of xDSL technology. The key to ADSL is that the upstream and downstream bandwidth is asymmetric, or uneven. In practice, the bandwidth from the provider to the user (downstream) will be the higher speed path. This is in part due to the limitation of the telephone cabling system and the desire to accommodate the typical Internet usage pattern where the majority of data is being sent to the user (programs, graphics, sounds and video) with minimal upload capacity required (keystrokes and mouse clicks). Downstream speeds typically range from 256Kbps to 1.5Mbps. Upstream speeds typically range from 64Kbps to 1Mbps. ADSL also allows the sharing of a single voice line. With ADSL, and RADSL, you can talk on the phone and be on the Internet at the same time with only one phone line. Saves the cost of a second phone line dedicated for an Internet connection.

RADSL (Rate Adaptive DSL)

Rate Adaptive Digital Subscriber Line (RADSL) refers to Qwest supplied ADSL lines that have rated speeds starting at 256Kbps up and down and goes up to 7.1Mbps down and 1Mbps up. RADSL also allows the sharing of a single voice line. With RADSL, and ADSL, you can talk on the phone and be on the Internet at the same time with only one phone line. Saves the cost of a second phone line dedicated for an Internet connection.

SDSL (Synchronous DSL)

Symmetrical Digital Subscriber Line (SDSL) runs at the same speed for